UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HONG-DA LIU
and YONG-NIEN RAO

Appeal 2007-2224
Application 10/032,523
Technology Center 2800

Decided: November 28, 2007

Before EDWARD C. KIMLIN, CHUNG K. PAK, and
JEFFREY T. SMITH, *Administrative Patent Judges*.

SMITH, *Administrative Patent Judge*.

DECISION ON APPEAL

Statement of the Case

This is an appeal under 35 U.S.C. § 134 from a final rejection of claims 1, 3-14 and 16-20. We have jurisdiction under 35 U.S.C. § 6.

Appellants' invention relates to a liquid crystal on silicon structure that incorporates integrated spacers and silicon light valves and a method for fabricating such structure. An understanding of Appellants' claimed invention can be gleaned from independent claim 1 which appears below:

> 1. A liquid crystal on silicon structure incorporating integrated spacers and silicon light valves comprising:
>
> a silicon substrate having a first multiplicity of pixel electrodes formed on a top surface;
>
> a second multiplicity of integrated spacers formed of an insulating material on said top surface of the silicon substrate in-between said first multiplicity of pixel electrodes;
>
> a third multiplicity of silicon light valves formed on said top surface of the silicon substrate for orienting liquid crystal molecules;
>
> a glass substrate that is optically transparent having an optically transparent electrode layer coated on a bottom surface positioned juxtaposed to and over said silicon substrate supported by said second multiplicity of integrated spacers forming a sealed cavity by engaging a perimeter seal surrounding said two substrates, said sealed cavity encases said optically transparent electrode layer and said third multiplicity of silicon light valves therein; and
>
> a liquid crystal material comprising a multiplicity of multi-domain homeotropically aligned liquid crystal cell filling said sealed cavity.

The Examiner relies on the following references in rejecting the appealed subject matter:

Saito	6,304,308 B1	Oct. 16, 2001

Lu	6,426,786 B1	Jul. 30, 2002
Kim	6,525,794 B1	Feb. 25, 2003
Iwaki	5,646,532	Jul. 8, 1997
Bischel	5,544,268	Aug. 6, 1996
Rosenblatt	5,477,358	Dec. 19, 1995
Nishio	6,046,547	Apr. 4, 2000
Akimoto	JP361215522	Sep. 25, 1986

I. Claims 1, 3, 10, 12, 14 and 16 stand rejected under 35 U.S.C. 103(a) as unpatentable over Saito in view of Lu.

II. Claims 4 and 17 stand rejected under 35 U.S.C. 103(a) as unpatentable over Saito in view of Lu and in further view of Kim.

III. Claim 5 stands rejected under 35 U.S.C. 103(a) as unpatentable over Saito in view of Lu and in further view of Iwaki.

IV. Claim 6 stands rejected under 35 U.S.C. 103(a) as unpatentable over Saito in view of Lu and in further view of Bischel.

V. Claim 7 stands rejected under 35 U.S.C. 103(a) as unpatentable over Saito in view of Lu and in further view of Rosenblatt.

VI. Claims 8 and 18 stand rejected under 35 U.S.C. 103(a) as unpatentable over Saito in view of Lu and in further view of Akimoto.

VII. Claims 9, 11 and 19-20 stand rejected under 35 U.S.C. 103(a) as unpatentable over Saito in view of Lu.

VIII. Claim 13 stands rejected under 35 U.S.C. 103(a) as unpatentable over Saito in view of Lu and in further view of Nishio.

At the outset, we note that the Examiner (Ans. 2-3) indicated that Appellants did not discuss all of the references that were cited in the rejection of claims 4, 5, and 17 (II and III above). Despite this notification, Appellants did not file a responsive brief addressing the rejection as presented in the present record. Consequently, the arguments presented by Appellants in support of the patentability of subject matter of claims 4, 5 and 17 do not address the rejections as presented in the present record. Since Appellants did not identify the errors in the stated rejection, we summarily sustain the Examiner's rejections of claims 4, 5 and 17 for the reasons presented in the present record and infra.

We have thoroughly reviewed each of Appellants' arguments for patentability. However, we are in complete agreement with the Examiner that the claimed subject matter would have been obvious to one of ordinary skill in the art within the meaning of § 103 in view of the applied prior art. Accordingly, we will sustain the Examiner's rejections.

Appellants contend that Saito does not express any desire for a specific type of an improved liquid crystal material for use in the disclosed liquid crystal display. Thus, according to Appellants, there can be no motivation to combine the teachings of Lu to include multi-domain homeotropically aligned liquid crystal cells in the liquid crystal display device of Saito (Br. 10).

The Examiner contends that Saito describes liquid crystal silicon structures incorporating integrated spacers and silicon light valves. The Examiner recognizes that Saito does not disclose a

multiplicity of multi-domain homeotropically aligned liquid crystal cells and does not provide a disclosure for a specific type of liquid crystal material. The Examiner contends that Lu describes a liquid crystal comprising a multiplicity of multi-domain homeotropically aligned liquid crystal cells which contribute to high contrast ratio, good display quality and high photo-stability. The Examiner concludes that it would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize a multiplicity of multi-domain homeotropically aligned crystal cells in the liquid crystal device of Saito to obtain the recognized advantages thereof (Ans. 5-7).

The issue presented is as follows:

Has with the Examiner reasonably determined that cited prior art would have led a person of ordinary skill in the art to utilize a multiplicity of multi-domain homeotropically aligned crystal cells in a liquid crystal device within the meaning of 35 U.S.C. § 103? On this record, we answer this question in the affirmative.

Under 35 U.S.C. § 103, the factual inquiry into obviousness requires a determination of: (1) the scope and content of the prior art; (2) the differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). "[A]nalysis [of whether the subject matter of a claim would have been obvious] need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of

ordinary skill in the art would employ." *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1740-41 (2007) *quoting In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006); *see also DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1361 (Fed. Cir. 2006) ("The motivation need not be found in the references sought to be combined, but may be found in any number of sources, including common knowledge, the prior art as a whole, or the nature of the problem itself."); *In re Bozek*, 416 F.2d 1385, 1390 (CCPA 1969) ("Having established that this knowledge was in the art, the examiner could then properly rely, as put forth by the solicitor, on a conclusion of obviousness 'from common knowledge and common sense of the person of ordinary skill in the art without any specific hint or suggestion in a particular reference.'"); *In re Hoeschele*, 406 F.2d 1403, 1406-407 (CCPA 1969) ("[I]t is proper to take into account not only specific teachings of the references but also the inferences which one skilled in the art would reasonably be expected to draw therefrom . . .").

Appellants contend that the novelty of the liquid crystal device of Saito resides in the use of an optical shield film and not in the use of a specific liquid crystal material. Thus, there is no motivation to employ multi-domain homeotropically aligned liquid crystal cells in the liquid crystal device of Saito (Br. 9-10). Appellants further contend that the prior art does not suggest the desirability of the modification (Br. 10).

We agree with the Examiner (Ans. 13) that Lu describes the advantage of utilizing multi-domain homeotropically aligned liquid

crystal cells in liquid crystal devices (see Lu col. 1, 13-22). Thus, a person of ordinary skill in the art would have recognized based on the teachings of Lu that the multiplicity of multi-domain homeotropically aligned liquid crystal cells results in high contrast ratio, good display quality and high photo-stability. A person of ordinary skill in the art would have reasonably expected that the utilization of a homeotropically aligned liquid crystal cell material in the liquid crystal device of Saito would have achieved the advantages described by Lu. "For obviousness under § 103, all that is required is a reasonable expectation of success." *In re O'Farrell*, 853 F.2d 894, 904 (Fed. Cir. 1988).

Appellants' arguments regarding claims 6, 7, 8, 9, 11, 13, and 18-20 are not persuasive. The Examiner has added additional prior art references to the combination of Saito and Lu to address the specific limitations of these claims. Appellants' principal arguments are that the claimed multi-domain homeotropically aligned liquid crystal cells in a liquid crystal device are not taught or suggested by Saito, Lu or the additional prior art references. These arguments are not persuasive for the reasons set forth above. Moreover, Appellants have not specifically argued that the additional prior art references do not teach the features identified by the Examiner.

For the foregoing reasons and those presented in the Answer, the rejection of claims 1, 3-14 and 16-20 under 35 U.S.C. § 103(a) is affirmed. As a final point, we note that Appellants base no argument upon objective evidence of nonobviousness, such as unexpected results.

ORDER

The rejection of claims 1, 3-14, and 16-20 under 35 U.S.C. §103 (a) is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

tc/ls

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